



# A CITIZEN'S GUIDE TO THE CITY OF NAPA, NAPA RIVER, & NAPA CREEK FLOOD PROTECTION PROJECT



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This Guidebook has been prepared by the U.S. Army Corps of Engineers and Napa County Flood Control and Water Conservation District to provide information about the Napa River and Creek Draft Supplemental Environmental Impact Statement/Environmental Impact Report (Draft SEIS/EIR).

*The City of Napa Flood Protection Project is a collaborative effort of Citizens for Napa River Flood Management, the U.S. Army Corps of Engineers, and Napa County Flood Control & Water Conservation District.*

## HOW TO USE THIS GUIDE

This Citizen's Guide is intended as a useful summary of the environmental, social, and economic benefits and costs of the City of Napa Flood Protection Project. The Project ensures 100-year flood protection within the City of Napa along Napa River and Napa Creek, and forms the core of the Napa River Flood Protection Plan, a Countywide effort for integrated watershed protection and regional flood protection.

Throughout this Guide, the term "**Project**" refers to the City of Napa Flood Protection Project, which includes the Napa River from the Butler Bridge (Highway 29), to Trancas Street on the north, and includes Napa Creek to Jefferson Street. The term "**Plan**" refers to the Napa River Flood Protection Plan, which includes the Project, as well as additional watershed protection strategies throughout Napa County.


A glossary of terms is found at the end of this Guide, providing definitions for technical terms shown in ***bold italic*** in the text.



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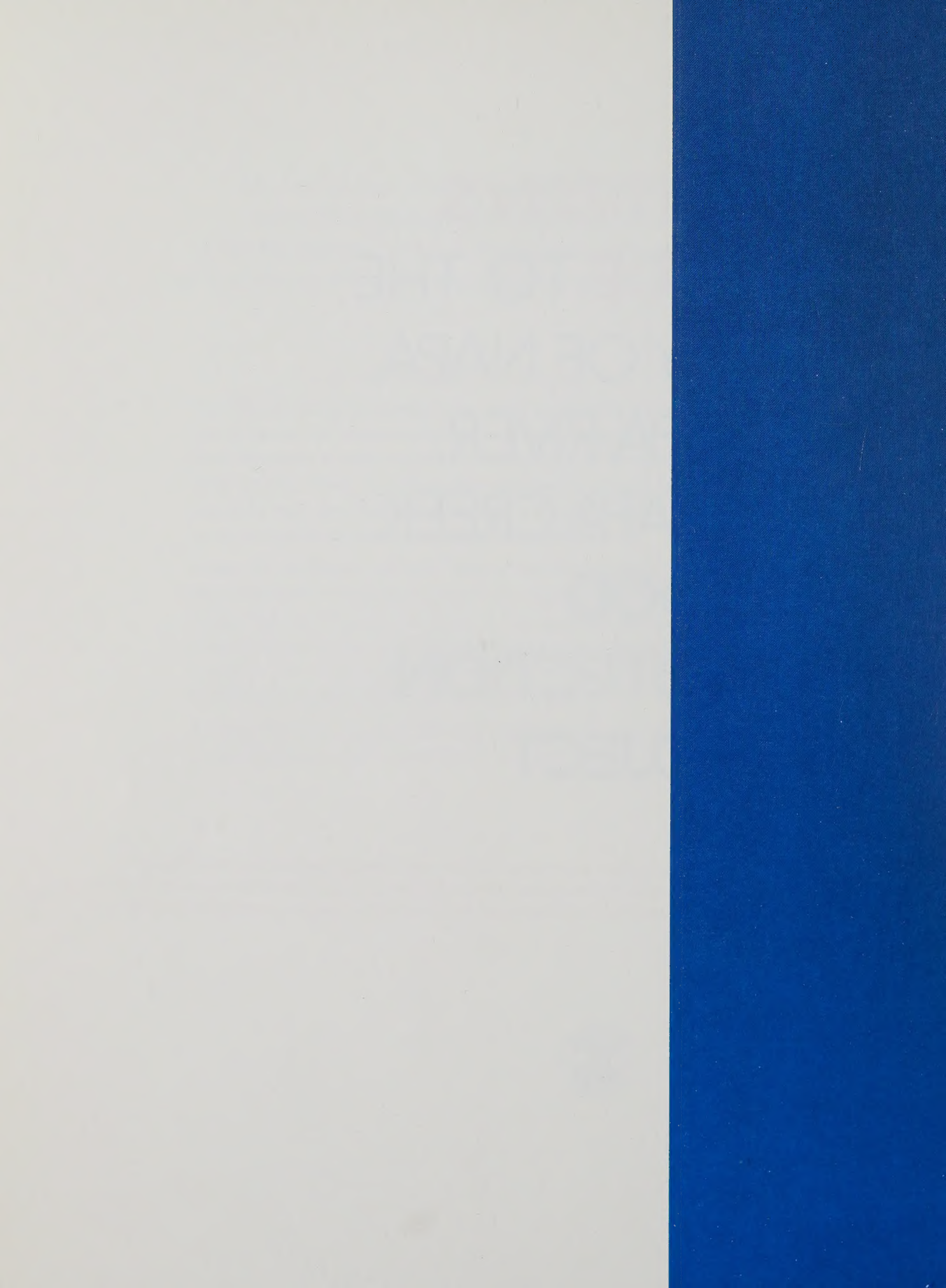
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# *Project History*





**WHAT** WE ARE EMBARKING UPON IS **EXTRAORDINARY**. FOR OVER A CENTURY, WE HAVE FOUGHT A LOSING BATTLE AGAINST THE **NAPA RIVER**. OUR TRADITIONAL APPROACHES TO FLOOD CONTROL HAVE CONTINUALLY FAILED US BECAUSE THEY REFUSE TO ACKNOWLEDGE OR RESPECT THE RIVER'S **NATURAL TENDENCIES**.

### *What Is A Living River?*

With the help of the U.S. Army Corps of Engineers, the Napa community has created a plan for 100-year flood protection which allows the river to *be a river*—not a flood channel. We envision a Napa River which meanders, speeds up and slows down, and rises and falls with the tides, gently submerging the new marshes and wetlands that line its banks. The Napa community envisions a living river.

**The City of Napa Flood Protection Project** is an innovative blend of ecology and engineering which, by guiding the river's energy rather than confining it, minimizes the need for channel dredging and the perpetual construction and maintenance of new *levees, dikes, and flood-walls*. These valuable engineering feats will be required only in the City's most vulnerable areas which, through a living river approach, become significantly fewer.

By taking 20 minutes to read through the following pages, you will gain an understanding of the Project, its history, and its future impact on all of our lives.



## *Why is This Project Needed?*

On New Year's Day 1997, Napa County residents awoke to the steady drumming of rain on their rooftops. By the end of the following day, it was clear that emergency procedures were needed to protect homes, businesses, and byways from the rising waters of the Napa River. For the third time in as many years, Napa braced for flood conditions, preparing for the worst and hoping for the best.

This was just the latest in a long history of flooding disasters. During the past 36 years of flooding, Napa County residents have suffered devastating loss of lives and livelihoods, and over \$542 million in property damage alone. According to the most up-to-date models, uncontrolled flooding over the next 100 years will likely cause *\$1.6 billion* worth of property



*For those who hurled sand bags at the rising waters, and whose homes, farms, and businesses were washed away despite all the heroic efforts, flood control is not a seasonal issue.*



damage. As always, the loss of lives and livelihoods will be immeasurable.

The problem is clear. But finding “the high ground”—an ecologically, socially, and economically acceptable plan for flood control—has not been easy. Previous efforts have fallen short of acceptability in one or more of these areas, and so the flooding continues. In the meantime, the federal program that was established to provide funding for flood control projects nationwide has been scaled back significantly, and Napa finds itself in jeopardy of losing those critical federal commitments.

### *What Was the Process for Developing the Current Project?*

Since the 1930's, Napa County residents have made several concerted efforts to address flooding. The most recent effort began in 1965, when Congress authorized the development of a detailed project proposal for flood protection. In 1975, the U.S. Army Corps of Engineers submitted the first project proposal under the 1965 *Authorization*. Napa County voters rejected the proposal in referendum elections in both 1976 and 1977, and it was subsequently shelved. When the floods of 1986 hit the Napa valley, the City of Napa requested that the project be reactivated. The Corps responded with a revised proposal in 1995. Again, it was deemed unacceptable.

As frustrating as the rejections were, not just for the Corps, but for all those who desperately wanted a solution, a new approach emerged which looked at flood control from a broader, more comprehensive perspective. Citizens for Napa River Flood Management was formed, bringing together a diverse group of local engineers, architects, aquatic

#### CITIZENS FOR NAPA RIVER FLOOD MANAGEMENT

Friends of the Napa River  
Napa Valley Economic Development Corporation  
Napa County Resource Conservation District/RCD  
California Dept. of Fish & Game  
Napa Chamber of Commerce  
United Napa Valley Associates  
American Center for Wine, Food & Arts  
National Resource Conservation Service (NRCS)  
Homeowners: GSMOL & 1st St. Neighbors  
Napa County Landmarks  
Napa Valley Vintners Association  
Sierra Club  
Flood Plain Business Coalition  
Up Valley Chambers of Commerce  
Napa County Land Trust  
Napa-Solano Building Trades Council  
Napa Valley Fisherman's Associations  
Napa Valley Conference & Visitors Bureau  
Napa Downtown Merchants  
Napa Valley Expo  
Napa County Farm Bureau  
Napa Valley Grape Growers Association  
Suscol Council  
Agricultural Commission  
U.S. Army Corps of Engineers  
Napa County Flood Control & Water Conservation District  
Napa County  
City of American Canyon  
City of Calistoga  
City of Napa  
City of St. Helena  
City of Yountville

ecologists, business and agricultural leaders, environmentalists, government officials, homeowners and renters, and numerous community organizations.

Through a series of public meetings and intensive debates over every aspect of Napa's flooding problems, the Citizens for Napa River Flood Management crafted a flood management plan offering a range of benefits for the entire Napa region. The U.S. Army Corps of Engineers served as a resource for the group, helping to evaluate their approach to flood management. The final plan produced by the Citizens for Napa River Flood Management was successfully evaluated through the research, experience, and state-of-the-art simulation tools developed by both the Army Corps of Engineers and numerous international experts in the field of hydrology and other related disciplines. The success of this collaboration serves as a model—not just for Napa, but for the nation.

### *Establishing Goals: Blending Engineering and Ecology*

Citizens for Napa River Flood Management established the following agreed-upon set of goals, initially for the City of Napa, but quickly expanded to include all of Napa County:

- 100-year flood protection;
- An environmentally-restored, "living" Napa River;
- Enhanced opportunities for economic development;
- A local financing plan that the community could support;
- A plan that addresses the entire watershed countywide.

### *Examining Potential Strategies*

Building on members' expertise, Citizens for Napa River Flood Management members examined the range of potential strategies that could achieve these goals. Some of the broad categories considered were:

#### *Changing Reservoir Use*

Increasing the use of existing *reservoirs* for flood control purposes as well as water supply.



### *Up-Valley Strategies*

Holding more water upriver during potential flood events, reducing the flow through the City of Napa, then releasing the stored water as conditions permit.

### *Down-River Strategies*

Improving “drainage” at the mouth of the Napa River, thereby increasing the rate of flow through the City of Napa and preventing the accumulation of flood waters.

### *Watershed Protection Strategies*

Improving the capacity of the entire *watershed* to control and direct flood flows by altering land-use practices.

### *Risk Reduction Strategies*

Elevating and/or relocating homes and businesses in the *floodplain*.

### *Evaluating Alternative Strategies*

As each of these strategies were examined, both individually and in combinations, some conclusions emerged:

- No configuration of new or expanded-capacity dams and reservoirs upriver could adequately reduce flood flows into Napa;
- Increasing the rate of flow through the City of Napa by improving “drainage” at the mouth of the Napa River would create erosion and would not significantly reduce flood levels;
- Improving the capacity of the entire watershed to control and direct flood flows is a desirable goal, but by itself cannot prevent major flood events, which occur naturally;
- Elevating and/or relocating homes and businesses in the floodplain would be extremely costly and, in many cases, infeasible.

### WHAT IS 100-YEAR FLOOD PROTECTION ?

Despite its name, a “100-year flood” is not a flood which comes once every 100 years, nor is it the largest flood that has occurred in the last 100 years. The 100-year flood is an event that has a 1 in 100 chance (1%) of occurring in any given year. In the case of the Napa River, a 100-year flood is roughly 41,000 cubic feet of flow per second (cfs) compared to average annual flow of 1,300 cfs.

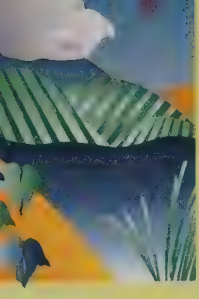
Potentially less damaging, but statistically more frequent, a 50-year flood has a 2% chance of occurring in any given year. A 200-year flood has a 0.5 % chance of occurring in any given year, and so forth. The 1986 flood in the City of Napa is classified as a 50-year flood.

The current design evolved from a series of analyses and informed debates about which strategies, or combination of strategies, best met the Project objectives.

The U.S. Army Corps of Engineers, lead federal agency for the Project, is required to submit a detailed proposal describing the project and the rationale behind the proposed design. In addition, the Corps must prepare a Supplemental Environmental Impact Statement/Environmental Impact Report (SEIS/EIR) detailing the environmental analyses and mitigation measures contained in the Project.

These environmental documents are available in their entirety for public review at various locations throughout the County (see back cover for additional information). The remainder of this Guide presents some of the highlights of the Project design and an analysis of its social and environmental impacts and mitigations. A financial analysis of the Project is offered in the final section.





# *Project Overview*

A detailed analysis of the Project Overview and specific topics listed below can be found in Volume II, Chapters 3 and 4 of the Draft SEIS/EIR.

*100-Year Storm Event:*  
Chapter 3

*Lowering of Old Dikes:*  
Chapter 3

*Marsh Plain and  
Floodplain Terraces:*  
Chapter 3

*Dry Bypass:*  
Chapter 4

*Conveyance Improvements:*  
Chapter 4

*Bank Stabilization:*  
Chapter 4

*Pump Stations:*  
Chapter 4

*Grade Control:*  
Chapter 4

*Bridge Replacements:*  
Chapter 4



RETURNING THE **NAPA RIVER** TO ITS NATURAL FLOODPLAIN REQUIRES A CREATIVE BLEND OF **ECOLOGY** AND **ENGINEERING**. ONCE AN INTEGRAL PART OF THE RIVER, FLOODPLAINS WILL BE RE-ESTABLISHED AT TWO LEVELS TO AID THE PASSAGE OF FLOOD WATERS. A **DRY BYPASS** ALLOWS RAGING FLOOD WATERS TO SAFELY SHORTCUT THE OXBOW, RETURNING ONLY WHEN THE RIVER SUBSIDES. YET, TO ENSURE **100-YEAR FLOOD PROTECTION**, THE PROJECT ALSO INCLUDES NEW **LEVEES, DIKES, CULVERTS, BRIDGE REPLACEMENTS, AND FLOOD-WALLS** IN THE MOST VULNERABLE AREAS.

### ***How Will the Project Protect Us from a 100-Year Storm Event?***

The Draft SEIS/EIR details how the City of Napa Flood Protection Project will achieve 100-year storm protection. Acknowledging the river's natural state, the Project utilizes a set of living river strategies that minimize the disruption and alteration of the river habitat, and maximize the opportunities for environmental restoration and enhancement throughout the watershed. As defined by the Citizens for Napa River Flood Management, "A living Napa River would consist of a river system with structure, function, and diversity. It would have the physical, chemical, and biological components that function together to produce complex, diverse communities of people, plants, and animals."

## A living Napa River:

- **Conveys** variable flows and restores habitat in the **floodplain**;
- Balances **sediment** input with sediment transport;
- Provides natural fish and wildlife habitat;
- Maintains high water quality and supply;
- Offers improved recreation opportunities;
- Maintains its aesthetic qualities; and
- Generally enhances the human environment.



*To accommodate healthy new floodplains and wetlands along Oil Company Road, the Project mandates the removal and clean-up of toxic waste which has accumulated over decades.*

The approach of Citizens for Napa River Flood Management is based on the natural processes and characteristics of the Napa River itself, incorporating the following principles of **geomorphology**:

- Maintaining the natural slope of the river—the slope should not be altered significantly by dredging or straightening;
- Maintaining the natural width of the river;
- Maintaining the natural width/depth ratio of the river;
- Maintaining or restoring the connection of the river to the floodplain;



- Allowing the river to meander as much as possible;
- Maintaining channel features such as mud flats, shallows, sandbars, and a naturally uneven bottom; and
- Maintaining a continuous fish and *riparian* corridor along the river.

## *Flood Protection Components*

To achieve 100-year flood protection while maintaining the living river principles, the Project design includes the following engineered components:

- Lowering of old dikes;
- Marsh plain and floodplain terraces;
- Oxbow dry bypass;
- Napa Creek floodplain terrace;
- Upstream and downstream dry bypass culverts along Napa Creek;
- New dikes, levees, and flood-walls;
- Bank stabilization and protection (including a grade control structure);
- Pump stations and detention facilities; and
- Bridge replacements.

The maps on pages 17 through 20 illustrate where and how these components are used. Chapter 2 of the Draft SEIS/EIR provides the exact locations and specifics for each of the above components.

### *Lowering of Old Dikes*

To improve flow conditions, and to decrease flood water levels in the lower portion of the Project area, existing dikes will be lowered along the west side of the Napa River in the areas around Horseshoe Bend.

Under the current system of dikes, some areas remain dry, while others receive a disproportionate amount of flooding. Removing and/or lowering selected dikes will create a more equitable distribution of waters.



*An artist's simulation of the new marsh plain terrace and levee near Imola Avenue and Maxwell Bridge. Marsh plain terraces are submerged during the twice daily high tide cycles, creating a diverse and rich wetland habitat.*

### ***Terraces***

Providing room for rising flood waters, terraces are natural attributes of all river systems. Two types of terraces are included in the Project, beginning near Kennedy Park and extending to the southern end of the oxbow.

#### ***Marsh Plain Terraces***

Once a natural feature, marsh plain terraces will be established in several areas along the Napa River. Marsh plain terraces are submerged during the twice daily high tide cycles, creating a diverse and rich wetland habitat.



### ***Floodplain Terraces***

Elevated slightly from marsh plain terraces, floodplain terraces are inundated by flood waters once every few years, providing needed room for large flood events. When dry, floodplain terraces may offer opportunities for hiking and bird watching.

### ***Napa River Dry Bypass***

Following the most direct route over dry land, high flood waters traditionally forsake the long circular oxbow east of downtown Napa. Acknowledging this tendency, the Project includes a dedicated dry bypass, allowing the safe flow of excess water during floods, and serving as recreational and open space during normal flows, when the river returns to the meandering oxbow.

### ***Napa Creek Conveyance Improvements***

The Project includes flood reduction measures to Napa Creek between its confluence with the Napa River and Jefferson Street. Napa Creek conveyance will increase through the construction of a flood terrace on the north bank of the creek; the removal of the Brown Street, Coombs Street, and Behrens Street bridges; and the construction of two culvert dry bypasses.

#### ***Overflow Bypass Culvert Between Main and Pearl***

Allowing the existing stream geometry to remain, a concrete dry bypass culvert will be constructed on the north bank beginning just downstream of Main Street, and extending to the area upstream of Pearl Street. Approximately 450 feet long, 24 feet wide, and 9 feet high, the culvert will convey 2,000 of the 4,400 cubic feet per second of water expected in a 100-year flooding of Napa Creek.

#### ***Oxbow Bypass Culvert***

Beginning at Seminary Street, a second concrete dry bypass culvert will be constructed in the alley between Center and Earl Streets. Exiting below Seminary Street, the 550-foot culvert will carry excess flood waters without adversely affecting the creek geometry.

### *Dikes, Levees, Flood-Walls, and Near-Vertical Walls*

A series of aesthetically and functionally designed dikes, levees, and flood-walls provide needed safety while creating recreational opportunities throughout the Project reach.

#### *Levees*

A central element in flood protection strategies, levees are earthen structures, generally trapezoidal in shape, employed to contain flood waters. A total of seven levees are proposed throughout the Project reach and will be constructed at least 15 feet from the river's top bank to minimize habitat disruption along the river's edge.

#### *Flood-Walls*

Flood-walls are vertical structural walls of varying height, offering substantial protection from large flood events. The Project calls for the construction of several flood-walls throughout the Project's urban area. Through consultation with the Community Coalition Urban Design Workgroup (comprised of local architects), these walls will be integrated into the aesthetic designs of the community.



*Along Riverside Drive, a recreation trail snakes between an aesthetically surfaced flood-wall and the river.*



### ***Training Dikes***

Several locations downstream of Imola Avenue will see the construction of “training” dikes. While not providing 100-year flood protection by themselves, training dikes will maintain the level of protection currently existing downstream of Imola Avenue to the Butler Bridge.

### ***Near-Vertical Walls***

Extending from the bottom of the channel to the top of the bank, vertical walls will be selectively employed to protect the historic Hatt Building on the northwest side of the dry bypass, and in locations to allow existing street intersections to remain open.

### ***Bank Stabilization and Protection***

Erosion can damage existing banks, nearby structures, and proposed flood protection measures. The Project uses an integrated approach to bank stabilization and erosion control along the entire project reach.

Incorporating bioengineering techniques to optimize habitat development, treatments combine native vegetative cover in both marsh and floodplains; maintenance of existing trees; planting of new trees; and the addition of ***rock bank toe protection***. Additional bank stabilization and bank protection will occur at the entrances and exits of the new culverts along Napa Creek.

### ***Pump Stations and Detention Facilities***

During large events, the new flood-walls and levees will trap local storm water that would otherwise re-enter the river in developed areas. The Project includes the construction of three pump stations (see map) to safely return this water through the flood-walls into the Napa River.

### ***Grade Control Structure***

To reduce the erosive effects of fast moving water on stream beds, the Project proposes a grade control structure in the section of Napa Creek just downstream of Jefferson Street. While protecting the bed from erosion, the

structure will provide safe passage for fish, and will incorporate boulders and root wads to improve aquatic habitat.

### *Bridge Reconstruction, Roadway Closures, and Alterations*

There are seven existing bridges in the City of Napa which are not designed to withstand 100-year flood flows. During high flood waters, the bridges act as dams, trapping debris and impeding flows.

#### *New and Removed Bridges*

The Project includes the new construction or replacement of the following five Napa River bridges:

- Third Street Bridge over the Napa River;
- Soscol Avenue Bridge over the bypass;
- First Street Bridge over the bypass and Napa Creek;
- First Street Bridge over the Napa River (funded independently by the City of Napa);
- A causeway in the east approach to Maxwell Bridge.

The following three bridges over Napa Creek will be removed:

- Coombs Street Bridge (replaced with a pedestrian bridge);
- Brown Street Bridge (no replacement);
- Behrens Street Bridge (replaced with a pedestrian bridge).

#### *Roadway Closures and Alterations*

The Project also calls for the closure, rerouting, or new construction of several roads in the Napa area:

- McKinstry Street will be rebuilt, remaining closed during stormy conditions;
- Soscol Avenue will be raised a maximum of three feet between the Napa River and its northern crossing over the railroad;
- First Street will be raised a maximum of three feet between Napa Creek and McKinstry Street;



*Following the most direct route over dry land, high flood waters traditionally forsake the long circular oxbow east of downtown Napa. Acknowledging this tendency, the Project includes a dedicated dry bypass allowing the safe flow of excess water during floods, and serving as recreational and open space during normal flows, as the river returns to the meandering oxbow.*

- Third Street between Main Street and Soscol Avenue will be raised gradually to a high point of three feet over the river;
- Riverside Drive will become a one-way street between Brown Street and Oak Street, and Pine Street and Elm Street.



# THE CITY OF NAPA, NAPA RIVER, & NAPA CREEK FLOOD PROTECTION PROJECT

## Marsh Plain and Floodplain Terraces



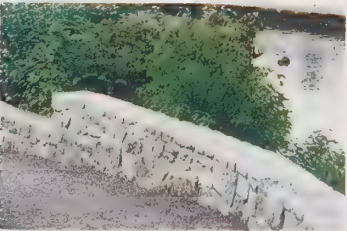
Marsh plain terraces are inundated during the twice daily high tide cycles, creating a diverse wetland habitat. Elevated slightly from marsh plain terraces, floodplain terraces are flooded at least once every two years, providing needed room for large flood events.

## New and Restored Wetlands

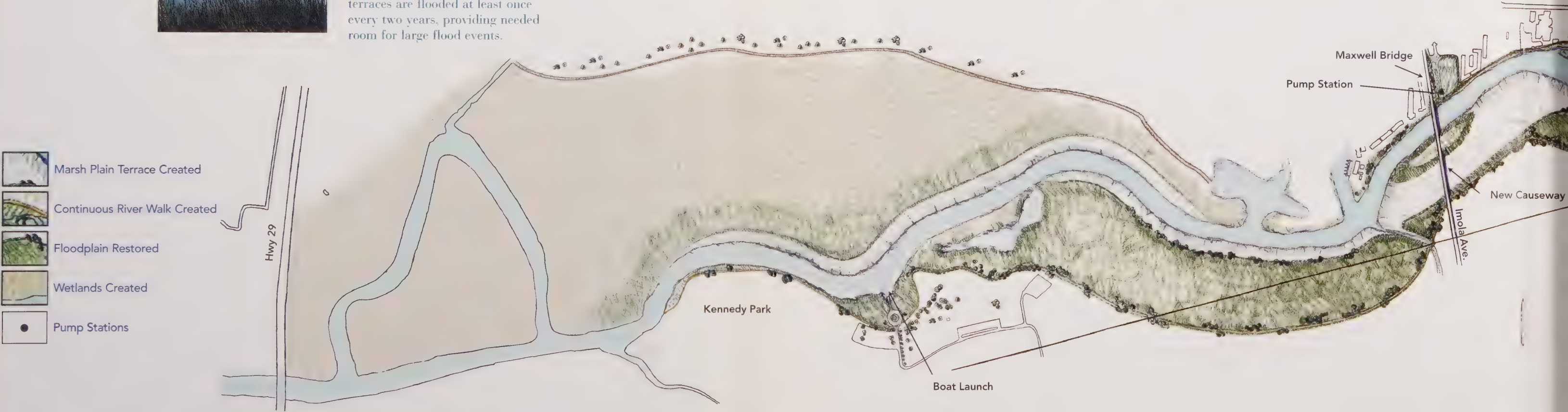


Through concerted planting efforts and the removal and lowering of levees, the Project will create 108 acres of new wetland habitat, including emergent marsh, riparian and seasonal wetlands.

## Bank Stabilization and Protection



Bank stabilization techniques combine native vegetative cover in both marsh and floodplains; maintenance of existing trees; planting of new trees; and the addition of rock bank toe protection.





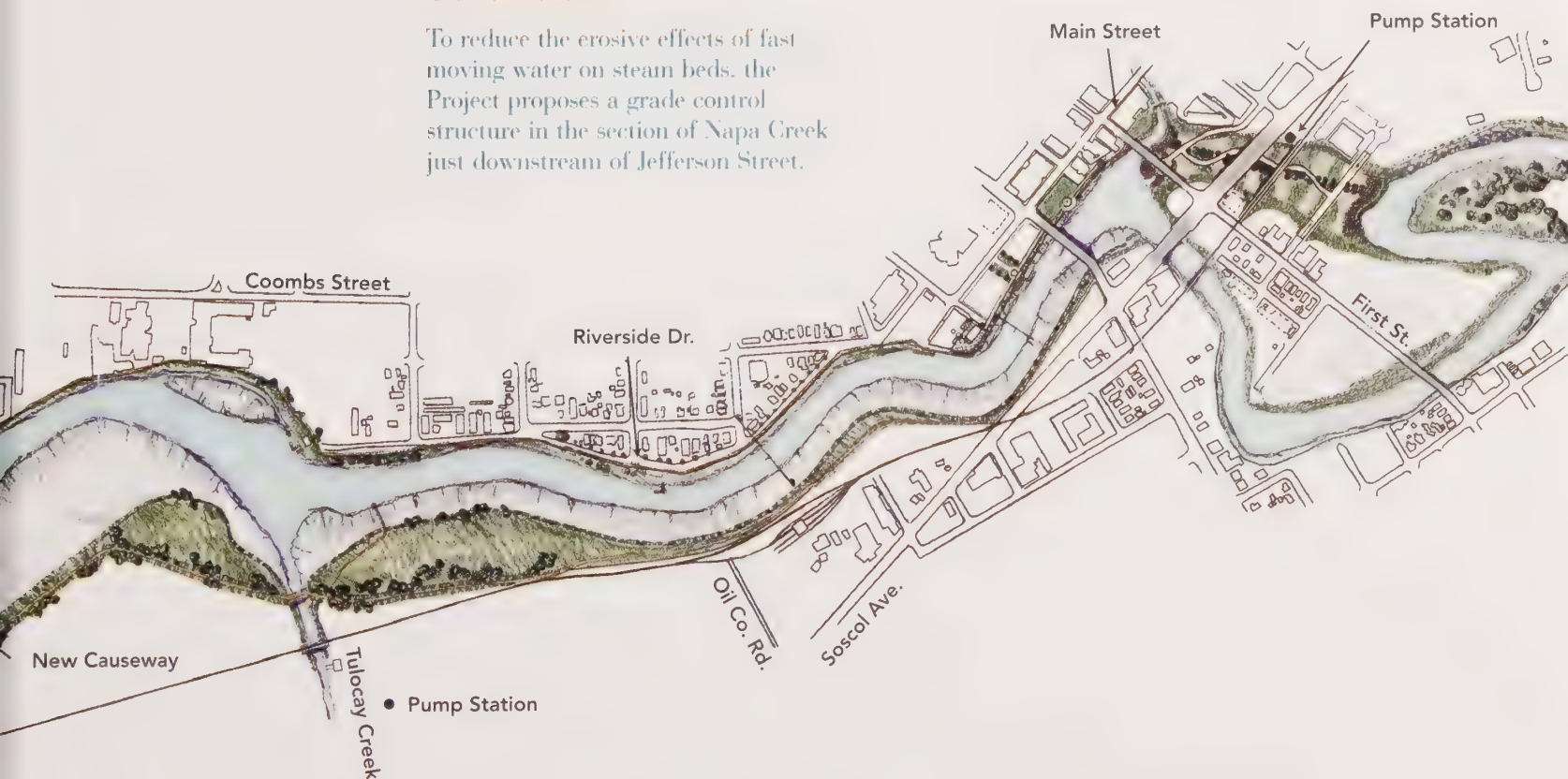
## Napa Creek Conveyance

Napa Creek conveyance will be increased by the construction of a flood terrace on the north bank of the creek: the removal of the Brown Street, Coombs Street, and Behrens Street bridges; and the construction of culvert dry bypasses.



## Grade Control Structure

To reduce the erosive effects of fast moving water on stream beds, the Project proposes a grade control structure in the section of Napa Creek just downstream of Jefferson Street.



## Napa River Dry Bypass



A dedicated dry bypass allows the safe flow of excess flood water and serves as recreational and open space during normal flows, when the river returns to the meandering oxbow.

## Roadway Bridge Reconstruction



Overall, a total of seven bridges will be removed and replaced to allow the safe passage of water and debris during a 100-year flood.

## Napa Creek Bypass Culverts

Two concrete dry bypass culverts will be constructed, each designed to convey 2,000 of the 4,400 cubic feet per second of water expected in a 100-year flooding of Napa Creek.

## Pump Stations and Detention Facilities

During large events, the new flood-walls and levees will trap local storm water. The Project includes the construction of three pump stations to safely return this water through the flood-walls into the Napa River.

## Flood-Walls



Located at the tops of the river banks, flood-walls offer substantial protection from large flood events.



THE CITY OF NAPA,  
NAPA RIVER,  
& NAPA CREEK  
**FLOOD  
PROTECTION  
PROJECT**

*See map inside*



### ***Railroad Relocations***

To accommodate the new terraces, the railroad tracks will undergo slight realignments. Additionally, a new railroad bridge will be constructed over the bypass and will accommodate both the existing track and a platform for passenger loading. The existing train bridge over the Napa River will be removed and a new bridge constructed roughly three feet higher. The tracks on either side of the bridge will be raised to accommodate the increased bridge height.

### ***Project Phases***

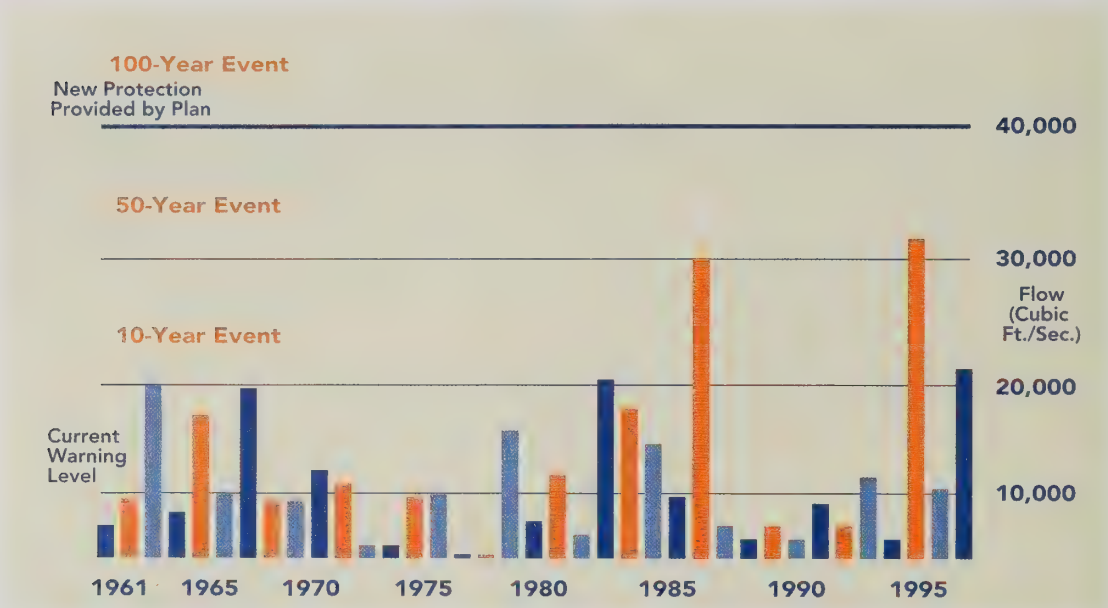
The Project is designed in seven distinct construction phases, occurring between the years 1999 and 2004. Chapter 2.11 of the Draft SEIS/EIR details the specific construction activities that will occur under each of these phases. Detailed plans are in place to mitigate the traffic disruptions likely under each phase, and are contained in the Draft SEIS/EIR, Chapter 3.10, Traffic Impacts.

### ***Maintenance: Ensuring Continued Protection***

Careful and regular inspections, monitoring, and maintenance are integral components of the Project. To set the stage for a comprehensive maintenance program, the Napa County Flood Control and Water Conservation District (NCFCWCD) will employ a performance-based model to show how the Project's design should perform under optimum conditions. Reviewed by the U.S. Army Corps of Engineers, the model includes predicted sedimentation and erosion rates and locations, as well as vegetative re-establishment patterns under ideal working conditions. This model serves as the standard by which actual long-term performance of the flood protection measures are evaluated. The maintenance program will focus on the discrepancy



## NEW PROTECTION LEVELS



*The effectiveness of the final plan has been repeatedly evaluated through research, experience, and state-of-the-art simulation tools developed by the U.S. Army Corps of Engineers and numerous international experts in the field of hydrology and other related disciplines.*

between the *actual* and the *ideal* and will consist of the following four sub-components:

### ***Monitoring***

Monitoring will occur along river cross-sections at the 20 locations most subject to deposition and weakening. Locations will be sounded and surveyed annually to determine levels of sedimentation and vegetative conditions. A photographic record of these attributes will be developed and maintained.

### ***Vegetation Removal***

In addition to its aesthetic qualities, vegetation provides critical habitat for many *riparian* species. In some cases, however, excess vegetation reduces the ability for the river to convey flood waters. These considerations are merged into a course of action that balances plant removal in some areas with the encouragement of beneficial natural plant communities in others.

### ***Erosion Control***

Erosion is a natural part of the river system and will be allowed to occur in many cases. Completely eliminating erosion by stabilizing banks can have negative effects on riparian habitat, and is suggested only when there are direct threats to flood-walls, levees, or bridge structures. The Project encourages natural vegetative solutions for erosion control, except when emergency measures, such as rock bedding, are needed.

### ***Sediment Removal***

The Napa River carries a large amount of sediment, and currently much of it is deposited in the section that runs through the City of Napa. While the living river principles that guide the Project do much to reduce this sedimentation, there is still risk of excess deposits over time. A preliminary analysis suggests that removal of sedimentation in the main channel will be necessary roughly every 8–10 years to help protect the marina from flooding and to provide an adequate navigational channel for boating. Sediment in the marsh plain terraces and floodplain terraces will require removal roughly every 20–25 years.

### **A LESSON LEARNED**

Until recently, the harsh environmental impacts of flood control efforts were generally accepted as unfortunate givens. However carefully it was done, the widening and deepening of a river channel removed valuable riparian habitat, displacing or killing the plant, fish, and wildlife species which rely upon it. Dredging and widening of the river bed also drastically lowered the quality of the water supply. In balancing flood control with environmental protection and enhancement, the City of Napa, Napa River, and Napa Creek Flood Protection Project represents a much needed departure from past flood control efforts.

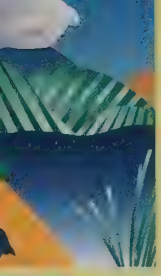
### ***Areas Not Receiving 100-Year Flood Protection***

There are a few selected areas within the Project boundaries that, under the current design, will not receive 100-year flood protection. The overall design of the Project ensures, however, that these areas will receive vastly improved protection from smaller, more frequent floods that would normally cause damage. These areas are few enough in number to be listed here:



- The Sea Scout Building on Riverside Drive is inside the planned flood-wall;
- Approximately five commercial buildings near Tulocay Creek on Soscol Avenue will remain in the floodplain. While the Project does not address these buildings, additional funds from the City of Napa and the NCFCWCD will likely be used to protect them;
- A few properties immediately adjacent to the east bank of the Napa River and north of the oxbow lie in an area proposed for residual flood conveyance. These include two residences on Silverado Trail near Hagen Road, a townhouse across from Stonecrest Drive, and the Country Garden Inn, also on Silverado Trail;
- The River City Restaurant and the Napa Small Animal Veterinary Hospital located on the west side of the river at 517 Lincoln Avenue lie on the river side of the proposed flood-wall. Funds will likely be available from the City of Napa or the NCFCWCD to elevate these buildings or to slightly modify the project to accommodate them.

Whether or not NCFCWCD funds provide 100-year flood protection for these properties, they will all be eligible for a separate Federal Emergency Management Agency (FEMA) grant program currently available in Napa. The City of Napa will provide application assistance to the owners of these properties.



# *Impacts & Mitigation*



A detailed analysis of the Project's impacts and mitigations listed below can be found in Chapters 2 and 3 of the Draft SEIS/EIR.

*Water Quality:*  
Chapter 3.2

*Hazardous Substances  
Remediation:*  
Chapter 3.3

*Biological Resources:*  
Chapter 3.4  
*Vegetation and Wildlife*  
*Fisheries and Aquatic*  
*Habitat*  
*Threatened and*  
*Endangered Species*

*Air Quality:*  
Chapter 3.13

*Cultural Resources:*  
Chapters 2.7, 3.5

*Aesthetics and Design*  
*Characteristics:*  
Chapter 2.6, 3.7

*Recreational Improvements:*  
Chapters 2.5, 3.11

*Soil Excavation and Disposal:*  
Chapter 2.3

*Roadway and Railroad*  
*Closures and Changes:*  
Chapter 2.4

*Displacement and Relocation:*  
Chapter 2.9

A CENTRAL FEATURE OF THE CITY OF NAPA FLOOD PROTECTION PROJECT IS ITS SUCCESS IN **BALANCING THE GOALS** OF FLOOD CONTROL AND ENVIRONMENTAL PROTECTION. THE CURRENT GEOMORPHIC CHANNEL DESIGN MINIMIZES DREDGING, GREATLY REDUCING DISRUPTION TO FISH, PLANT, AND WILDLIFE SPECIES. THE CREATION OF NEW MARSH PLAIN TERRACES AND THE **RECONNECTION OF THE RIVER TO ITS FLOODPLAIN** ARE DESIGN FEATURES WHICH ENHANCE FISH AND WILDLIFE HABITAT AND RESTORE THE NAPA RIVER TO ITS NATURAL STATE.

### ***What Are the Social and Environmental Impacts of the Project?***

The Project was analyzed to determine its impacts on a range of social and environmental factors, including riparian vegetation, fish and wildlife habitat, water quality, hazardous and toxic substances, cultural resources, aesthetics, recreation, and transportation. Many of the standards placed on the Project originated in the Living River document developed by Citizens for Napa River Flood Management. Highlights from these analyses are found below.

#### ***Water Quality***

By requiring minimal dredging, the geomorphic channel design helps ensure sustained high water quality throughout and downstream of the

Project reach. As in all construction projects, however, the run-off of construction supplies and waste could pose a threat to water quality during Project construction. The Draft SEIS/EIR requires the contractor to obtain all mandatory permits from the Regional Water Quality Control Board (RWQBD), the entity responsible for enforcing the National Pollution Discharge Elimination System Standards. Monitored by the RWQBD throughout the Project cycle, the permitting process establishes procedures for handling, storage, and disposal of all pollutants.

### *Biological Resources*

In Chapter 3.4, the Draft SEIS/EIS provides a comprehensive list of all habitat types and associated plant and animal species found within the Project Area, as well as the exact locations of the habitat alterations that will occur.

During construction, the excavation of terraces and the building of levees and dikes will significantly reduce vegetative cover. Over the longer term, however, the Project will enhance the overall health and abundance of both plant and animal life in the Napa area.

Through concerted planting efforts and the removal and lowering of levees, the Project will create 108 acres of new riparian habitat, including



*A simulation of the Hatt Building Walkway and the Third Street Bridge shows one of many aesthetic design possibilities. Here a geometric walkway is visually balanced by a natural marsh plain terrace on the opposite shore.*



emergent marsh and seasonal wetlands. Given a loss of only 36 acres (30% of which is of lower quality than the newly-created habitat), this represents a ratio of 3 to 1 in net habitat created. The types of habitat involved are listed below.

<i>Habitat Type</i>	<i>Acres Lost</i>	<i>Acres Created</i>	<i>Net Gain</i>
Riparian forest	5.03	4.58	(0.45)
Low-value woodlands	11.24	0.00	(11.24)
High-value woodlands	0.99	4.87	3.88
Emergent marsh	7.32	65.05	57.73
Seasonal wetlands	9.18	27.27	18.09
Tidal mudflats	0.00	3.56	3.56
Shaded riverine aquatic cover	0.31	0.99	0.68
Riparian scrub-shrub	2.03	1.96	(0.07)
<b>TOTALS</b>	<b>36.10</b>	<b>108.28</b>	<b>72.18</b>

Additionally, the implementation of the *Napa River Enhancement Plan*, developed by Philip Williams & Associates as a supplement to the Flood Protection Project, creates or restores over 200 additional acres of seasonal wetlands, intertidal mudflats and emergent marshland. The combination of the Project and the *Enhancement Plan* provide an overall habitat creation ratio of over 8 to 1. Most of this habitat will be created on the west side of the River, between the marinas and the Butler Bridge (Highway 29). Both the Draft SEIS/EIR and the *Enhancement Plan* provide detailed protocols for the location and types of planting that will occur.

Impacts to wildlife are closely related to the changing vegetative conditions. Until the 108 new acres are established, wildlife may be adversely impacted through loss of protective cover for breeding and foraging. Noise and other disruptions associated with construction may also cause temporary displacement. Yet over time, the maturing vegetation will provide enhanced wildlife habitat throughout the Project reach.

THROUGH  
CONCERTED  
PLANTING EFFORTS,  
THE PROJECT  
CREATES MORE  
VEGETATIVE HABITAT  
THAN IT REMOVES—  
A NET GAIN OF 72  
ACRES.

### *Fisheries and Aquatic Habitat*

In-water construction may temporarily displace resident and migratory fish species. As set forth in the Draft SEIS/EIR, this construction will be curtailed from December through April during steelhead trout migration. During the spawning and rearing season of the Sacramento Splittail, some in-water construction activities will also be curtailed or halted.

The Project's effect on fish and aquatic habitat will improve significantly following the construction period. *Turbidity* and *suspended sediment* levels will decrease dramatically through the filtering provided by the marsh plain terraces and wetlands.

### *Threatened and Endangered Species*

The U.S. Fish and Wildlife Service (USFWS) compiled the following list of 10 actual and proposed threatened and endangered species that may inhabit or utilize the Project area.

#### *Endangered Species*

- Salt Marsh Harvest Mouse
- American Peregrine Falcon
- California Freshwater Shrimp
- Contra Costa Goldfields

#### *Proposed Endangered*

- Showy Indian Clover

#### *Threatened Species*

- American Bald Eagle
- Northern Spotted Owl
- California Red-Legged Frog
- Central California Steelhead

#### *Proposed Threatened*

- Sacramento Splittail

There are 17 additional species listed in the Draft SEIS/EIR whose populations will be monitored closely during construction. If their numbers decline, the species will become listed and mitigation measures will be developed before construction could continue.

The Draft SEIS/EIR contains detailed information about the habitat requirements for each of the listed and proposed species, as well as the potential impacts of construction and long-term operation on their

survival. Of most concern are the temporary construction impacts on water quality and riparian habitat disruption.

Threatened and endangered species considerations are the primary impetus for the mitigation measures under the *Vegetation and Wildlife*, *Fisheries and Aquatic Habitat*, and *Water Quality* sections of the Draft SEIS/EIR. Additionally, individual mitigation plans for each threatened and endangered species are currently being formulated in consultation with the USFWS.

### ***Cultural Resources Mitigation***

As an historic city, Napa contains a number of old structures and archaeological sites that will be affected by the Project. During the preparation of plans and specifications, the U.S. Army Corps of Engineers, the California State Historic Preservation Office (SHPO) and NCFCWCD will address the impacts and mitigations for these historic sites.

Coordination with Native American organizations will also be initiated to establish a burial plan in the event that Native American human remains or artifacts are unearthed during construction.

### ***Hazardous Materials Remediation***

The Draft SEIS/EIR identifies 37 hazardous materials sites in the vicinity of the Project reach. Of these, 15 have already been cleaned and closed, requiring no further action. An additional 14 sites do not contain contamination that could be released or exposed through Project construction. In coordination with the Regional Water Quality Control Board, the local Project sponsor has assumed responsibility for the clean-up of the remaining eight sites, assuring completion before any excavation occurs.

TRAILS, INTERPRETIVE FACILITIES, AND RIVER ACCESS ARE JUST SOME OF THE WAYS THE PROJECT PRESERVES AND AUGMENTS RECREATIONAL OPPORTUNITIES THROUGHOUT THE CITY OF NAPA.



## ***Recreation Improvements***

The Project offers several opportunities to preserve and augment recreation in the Napa area.

### ***Trails***

Expanding the existing trail network, the Project provides pedestrian and bicycle trails along most of the river's bank—some as dedicated recreational trails, others on the proposed maintenance road and levees. New trails will be accompanied by benches, trash containers, shade trees, and drinking fountains.

### ***Interpretive Facilities***

The Napa River Flood Protection Project and its living river strategy offer prime opportunities to educate the public on this innovative blend of engineering and ecology. Accordingly, the Project includes several interpretive facilities for the public on both sides of the river.

### ***Other Aquatic Recreational Opportunities***

Plans are in the works for both boat and fishing access along the Napa River. Details on these amenities and their locations are forthcoming.

### ***Kennedy Park***

The Project requires that a section of Kennedy Park be set aside for new marsh and floodplain terraces. Another section is needed as a permanent storage site for excavated soil. With the exception of one baseball field, these sites do not overlap with current recreational areas. The baseball field could be rebuilt in a nearby location.

## ***Aesthetic and Design Characteristics***

The Draft SEIS/EIR dedicates an entire section to aesthetic principles governing the Project. Highlights include:

### ***Aesthetic Vegetation***

All new planting will balance functional and aesthetic traits. Examples of proposed plant species that fit these criteria are Coyote Brush, Mule Fat, Mugwort, California Wild Rose, Salmonberry, and native perennial grasses. Tree species include cottonwoods, sycamores, boxelders, Oregon Ash, and several oak species.

### ***Flood-Wall Treatment***

Flood-walls will be treated with special facing material to replicate the appearance of natural stone, brick, blocks, rocks, and other materials. In most areas, the flood-walls will be “backfilled” with soil and landscaped to minimize their visual presence.

### ***Bridge Treatments***

Although their exact designs have yet to be decided, all new and replaced bridges will balance function with aesthetics. The City of Napa will manage the bridge replacement design, engineering, and construction to assure consistency with City-wide design standards.

### ***Downtown Design Treatments***

In Chapter 2.6 of the Draft SEIS/EIR, the Coalition Urban Design Work Group suggests the following general design principles as guides for the entire Project:

- Maximize views of the river from roads, bridges, trails, and surrounding areas;
- Integrate the project into the surrounding urban fabric by minimizing physical and visual barriers, limiting the disruption of existing uses, and by integrating the design with compatible forms and materials;
- Maximize public access to the river: provide physical access to the water for fishing, boating, and paddling;

- Provide a continuous trail along the river on the east bank from Kennedy Park to Third Street; and on the west bank from Imola Avenue to Trancas Street, with connections and extensions to other local and regional trails.

### *Soil Excavation and Disposal*

To excavate the proposed terraces and the oxbow dry bypass, the Project will require the removal of roughly 1.6 million cubic yards of soil: 400,000 cubic yards from the west side of the river south of Imola Avenue, and 1.2 million cubic yards from the east side of the river and the bypass.

While new levees will incorporate some of this soil, excess amounts will require permanent disposal sites. To avoid the cost of transporting soil across the river, disposal sites—a combination of private and public land—have been identified on both sides of the river. These locations are provided in the Draft SEIS/EIR.

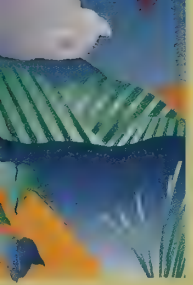
### *Displacement and Relocation*

The Project requires the removal of 109 buildings, including 17 residences, seven commercial buildings, and 14 warehouses. The remainder are mostly garages, sheds, barns, and other secondary buildings. Appendix E of the Draft SEIS/EIR lists each of these buildings.

Additionally, the 55 mobile home units and 33 recreational vehicle sites in the Valley Estates Mobile Home Park will require relocation. Because this mobile home park provides affordable housing to low- and moderate-income families, its successful relocation is a high priority for the City of Napa. The City is addressing the issue in a separate project and has received FEMA grants of \$4 million to fund it.

The Project is deeply committed to assisting those whose homes and businesses must be relocated. Comprehensive provisions for relocation assistance and business owners include advisory services, moving expense payment, and payment for equivalent housing and business space.





# *Costs & Benefits*

A detailed analysis of the Project's costs, benefits, and financing strategies can be found in the Local Financing Plan. Topics covered in the LFP include:

*General Costs*

*Basis of Costs*

*Cost Allocation*

*Economic Justification*

*Flood Damage*

*Average Annual Damages*

*Benefits Evaluation*

*Savings in Flood Insurance*

*Savings in Flood Proofing*

*Advanced Bridge Replacement*

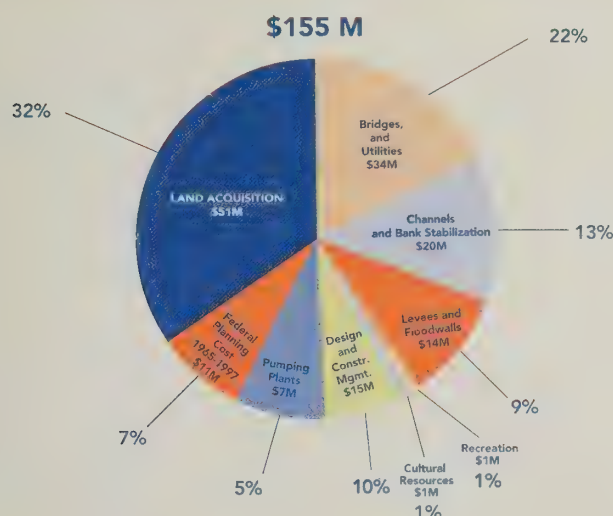
*Benefits*

## *What Are the Fiscal Costs and Benefits Associated With the Project, and How Will These Be Allocated?*

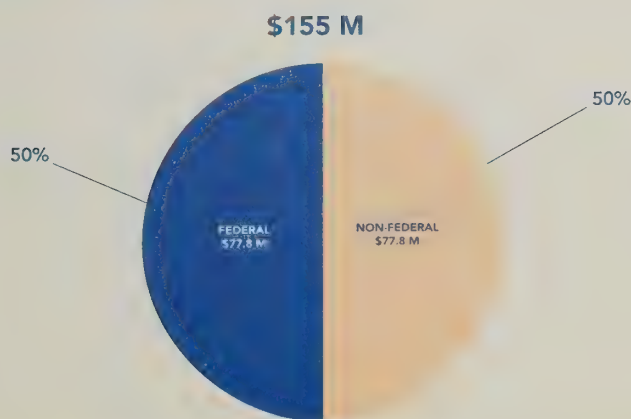
The following section is intended as an overview of Project financing. For more detailed information, including the fine points of interest, inflation, and capital management, consult the Local Financing Plan (LFP).

### CAPITAL FIRST COSTS & FINANCING

#### How much will it cost?



#### Who pays for it?



Costs are rounded to the nearest \$ million.  
Source: Local Financing Plan, Corps of Engineers, December, 1997



### *Capital Costs and Financing*

The total capital cost of the City of Napa Flood Protection Project is \$155.5 million.

The local non-federal sponsor is responsible for paying 50% of the total Project costs. The federal government will pay the other 50%. The local costs will include all land and easement costs, relocations and removal costs, disposal sites, and a 5% cash contribution towards the total Project cost. The local share will likely be raised through a half-cent sales tax increase (contingent upon voter approval in the upcoming election), credit for existing public and donated lands, and funding and grants from other local and state sources.

Although a separate component of the Project, the \$ 1.16 million cost of recreation improvements will also be shared evenly between the federal government and the City of Napa. The federal government will pay for the design, supervision, administration, and construction of the recreation features, while the City will pay for land acquisition, relocation, and any needed disposal sites.

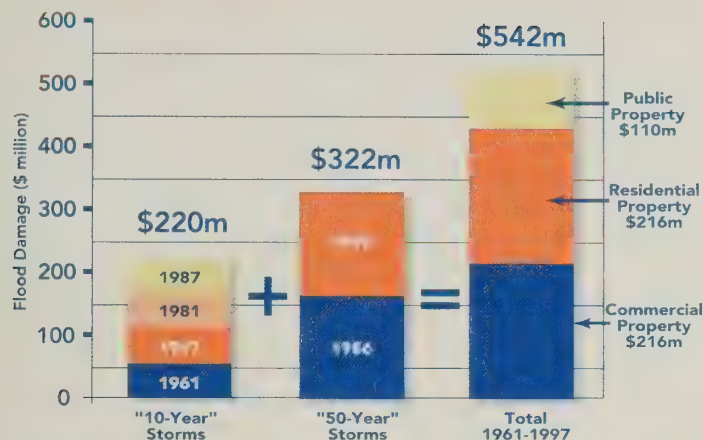
### *Future Costs*

As part of any long-term project and construction process, the time value of money is an important feature of the financing plan. The LFP provides a computation of future inflation and economic benefits as construction contracts are completed.

### *Maintenance Costs*

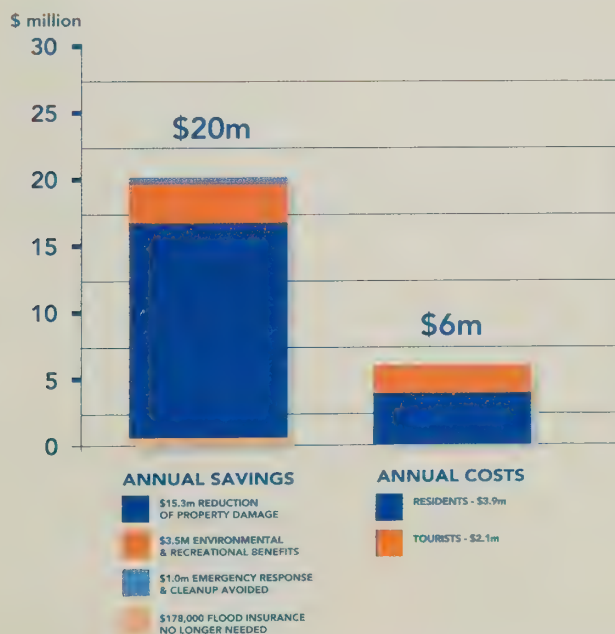
After the Project is constructed, its maintenance becomes the local sponsor's responsibility. During the first seven years of the Project, maintenance costs should be minimal. In years 8–20 of the Project, the half-cent sales tax increase will raise the needed \$365,000 yearly, totaling \$4.7 million over this 13-year period.

## THE COST OF FLOOD DAMAGE



From the onset of the project, capital from the maintenance budget will be used to seed a maintenance trust fund which, by the 21st year, will equal roughly \$10 million. Interest on this trust fund will be used to pay yearly maintenance after the 21st year, eliminating the half-cent sales tax increase.

## ANNUAL SAVINGS vs. ANNUAL COSTS



### *Is It Worth It? Let's Look at the Numbers.*

In the past 36 years, flooding has cost Napa residents \$542 million in property damage alone. A total of \$220 million was spent by residents, businesses, and governments just repairing damage from the 10-year floods of 1997, 1982, 1967, and 1963. The savings incurred from avoiding these small and frequent floods will more than pay for the entire Project.

Fifty-year floods, which occurred in 1986 and 1995, cost the community a total of \$322 million in repairs.

Based upon the most up-to-date projections in the Draft SEIS/EIR, future floods in Napa County will cost a total of \$1.6 billion over the next 100 years. By nullifying these expenditures, the Project, including all yearly maintenance costs, will save the community a projected \$20 million annually in today's prices.

Over the life of the Project, for every \$1 spent on flood protection, Napa City residents will receive a projected \$7 in savings on property damage alone.

Associated benefits of the Project include:

- Avoiding the unemployment and lost business revenue which traditionally accompany floods;
- Savings in annual flood insurance for the entire region;
- Property value enhancement throughout the Project reach;
- Continued tourist income during flood events; and
- Improvement of health and safety by increasing access to the urban areas of Napa.



## *Glossary of Terms*

**Authorization**—The current project design was authorized by Congress through the Flood Control Act of 1965 (Public Law 89-298). This authorization commits the federal government to pay 50% of the total cost of the project including recreational facilities.

**Bypass**—A secondary channel for flood waters. Bypass lands provide dry season recreational and community events locations.

**Conveyance**—The ability to transport and control the flow of water.

**Culvert**—An enclosed channel or conduit for carrying water under an embankment, road, etc.

**Dike**—An embankment or low ridge designed to hold back flood waters, constructed from excavated soil.

**Flood or flooding**—A temporary condition where normally dry land areas are inundated from the overland flow of inland water, or from the rapid accumulation of the runoff of surface waters.

**Floodplain**—Any land area susceptible to inundation by water.

**Flood-wall**—Vertical structural walls designed to protect life and property in the event of a flood.

**Geomorphic channel**—A channel design which abides by the natural principles of geomorphology: the relationship between the earth's surface feature (rivers) and its underlying geology (the stream bed).

**Hydrology**—The science that is concerned with the origin, circulation, distribution, and properties of water.

**Levee**—A fixed dirt ridge or embankment running alongside a river channel designed to protect life and property in the event of a flood.

**100-year flood**—A flood estimated to have a one (1) percent chance of occurring in any given year.

**50-year flood**—A flood estimated to have a two (2) percent chance of occurring in any given year.

**Oxbow**—A pronounced meander or horseshoe-shaped loop in a river and the land within this loop.

**Oxbow lake**—A curved lake formed when a river cuts across the neck of the oxbow and the ends become closed off.

**Reservoirs**—A place where water is collected and stored for use.

**Riparian**—Pertaining to, or situated on, the banks of a river.

**Rock bank toe protection**—Stones placed in the lowest reaches of the river bank to provide stabilization and to protect against erosion.

**Suspended sediment**—Organic (decomposing plants and other organisms) and/or inorganic (minerals) deposits which are small enough to float freely in water, affecting turbidity.

**Trench/seepage pipe**—Used to control water after it has traveled under the levee, but before it surfaces on the exterior (land) side of the levee.

**Turbidity**—A measure of the cloudiness of water, typically associated with suspended sediment.

**Watershed or catchment**—A topographically delineated area that is drained by a stream system, i.e. the total land area above some point on a stream or river that drains past that point.

**Weir**—A barrier across a canal or dam which serves to retain or regulate the flow of water.

The City of Napa Flood Protection Project is a collaborative effort of  
Citizens for Napa River Flood Management, the U.S. Army Corps of Engineers,  
and Napa County Flood Control & Water Conservation District.

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**The Draft Supplemental Environmental Impact Statement/  
Environmental Impact Report (Draft SEIS/EIR ) and the  
Local Financing Plan (LFP)** are available for public review  
at the following locations throughout the Napa Valley area:

NAPA MAIN LIBRARY  
580 Coombs Street  
Napa, CA 94559  
(707) 253-4241

YOUNTVILLE LIBRARY  
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Yountville, CA 94559  
(707) 944-1888

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NAPA COUNTY  
FLOOD CONTROL  
AND WATER CONSERVATION  
DISTRICT  
1195 Third Street, Room 310  
Napa, CA 94559-3082  
(707) 253-4823

CITY OF NAPA  
COMMUNITY RESOURCES  
DEPARTMENT  
1100 West Street  
Napa, CA 94559-0660  
(707) 257-9529

A text only version is  
available at [www.usace.mil](http://www.usace.mil)

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